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L11: Entry 2 of 7

File: USPT

May 26, 1987

DOCUMENT-IDENTIFIER: US 4668475 A

TITLE: Cleaning and disinfecting method and article of manufacture including color display

Abstract Paragraph Left (1):

A cleaning and disinfecting article of manufacture and method are provided wherein the cleaning and disinfecting article of manufacture comprises a cleaning and disinfecting ingredient which includes a cleaning and disinfecting agent, a solid color indicator composition which includes a color indicator agent and a matrix agent supporting the color indicator agent, wherein the matrix agent is a matrix salt; and a stabilizing salt. The cleaning and disinfecting ingredient has a bleaching tendency relative to the color indicator agent such that when the solid color indicator composition is in an aqueous solution of the cleaning and disinfecting ingredient, the presence of the cleaning and disinfecting ingredient in the solution minimizes the display of color in the solution for as long as significant amounts of the cleaning and disinfecting ingredient are present. The continued release of the color indicator agent from the solid color indicator composition after depletion of the ingredient results in a substantial display of color whereby the depletion of the cleaning and disinfecting ingredient can be detected, and such that when the stabilizing salt is in the solution, the cation of the stabilizing salt in the solution displaces the cation of the matrix salt in the solid color indicator composition.

Brief Summary Paragraph Right (1):

Aqueous calcium hypochlorite mixtures are used for various cleaning and disinfecting purposes, including germ control in swimming pools and disinfecting of toilet bowls and tanks. In many of these uses, it is helpful to include a color indicator in the hypochlorite mixture which will indicate when the hypochlorite concentration is reduced to a level such that the cleaning/disinfecting properties become ineffective or only marginally effective.

Brief Summary Paragraph Right (2):

Systems for indicating color incorporated in dispensers are disclosed in U.S. Pat. No. 4,171,546 issued to Dirksing, U.S. Pat. No. 4,200,606 issued to Kitko, U.S. Pat. No. 4,208,747 issued to Dirksing, and U.S. Pat. No. 4,216,027 issued to Wages. The Kitko '606 disclosure discusses a system wherein a dye is provided for giving a persistent color to the bowl water between flushes of the toilet. The objective is to assure a consumer that the bowl is being sanitized and means are provided to indicate the time when the disinfectant needs to be replaced. This is accomplished by controlling the quantities of $\text{Ca}(\text{OCl})_{2.0}$ and color indicator, contained in separate chambers, so that the source of the color indicator is exhausted at about the time the calcium hypochlorite is nearly exhausted.

Brief Summary Paragraph Right (3):

Other toilet tank dispensers for calcium hypochlorite mixtures have no provisions for indicating by means of color. For example, U.S. Pat. No. 3,837,017 issued to McDuffee discloses a passive system for cleaning toilet bowls wherein a container for calcium hypochlorite is located within a water tank associated with the bowl. A small diameter opening is provided within the top wall of the container to provide exposure to water in the tank so that the compound will be dissolved in the water and thereby delivered to the bowl when the toilet is flushed. An amount of inert particles, such as stone, may be included in the container to cooperate with the small diameter opening for purposes of limiting the rate of removal of the compound from within the container.

Brief Summary Paragraph Right (4):

U.S. Pat. No. 4,435,857 to Meloy, Meloy application Ser. No. 385,454, filed June 7, 1982, Meloy application Ser. No. 545,883 filed Oct. 27, 1983, Meloy application. Ser. No. 545,876 filed Oct. 27, 1983, and Meloy application. Ser. No. 565,720, incorporated herein by reference, disclose various indicator systems wherein hypochlorite or the like essentially bleaches out the color capability of a selected dye for as long as the hypochlorite is present in sufficient amounts. When the hypochlorite amounts are at or near exhaustion, the dye will provide a color signal indicating that a new supply of hypochlorite is required.

Brief Summary Paragraph Right (6):

This invention generally involves a cleaning and disinfecting composition and use thereof which includes a cleaning and disinfecting ingredient, which includes a cleaning and disinfecting agent, and a solid color indicator composition having a matrix agent and a color indicator, and which is adapted to release the color indicator at a controlled rate in an aqueous environment. The characteristics of the cleaning and disinfecting ingredient on the one hand, and of the color indicator on the other hand, are such that the latter is all or substantially bleached to a substantially colorless state as long as efficacious amounts of the cleaning and disinfecting agent are present and a substantially clear solution is dispensed during each toilet flush. However, when the cleaning and disinfecting agent is depleted to below efficacious levels, the bleaching capability is lost and a color signal appears. The user is then alerted to the need for changing the dispenser to provide a fresh supply of cleaning and disinfecting ingredient. The invention is particularly related to conservation of the physical integrity of and controlling the elution of dye from the solid color indicator composition when in contact with the aqueous solution of the cleaning and disinfecting ingredient.

Brief Summary Paragraph Right (7):

In the present invention the solid color indicator composition is in a cohesive form such as a bar or tablet. This color indicator composition includes a matrix agent which is a salt such that the cation in the matrix salt undergoes ion exchange with a cation from a stabilizing salt present in the solution, so that a complex is formed between the cation of the stabilizing salt and at least one anion of the matrix salt. This complex makes the tablet more resistant to degradation by the solution and may retard the elution of color indicator from the tablet. Thus, it has been found that the physical integrity of the solid composition, and the rate of release of the color indicator, can be controlled when the cleaning and disinfecting composition includes a cleaning and disinfecting ingredient which includes a cleaning and disinfecting agent, a solid color indicator composition which includes a color indicator agent and a matrix salt supporting the color indicator agent, and a stabilizing salt such that, when immersed in an aqueous environment, a cation in the matrix is displaced by a cation from the stabilizing salt in the solution. Thus, by including a salt as a matrix agent in the solid color indicator composition and a stabilizing salt in the solution, and by utilizing sufficient color indicator in the tablet or the like based on the calculated life of the cleaning and disinfecting ingredient in the system, the color signal may be reliably provided on an efficient basis.

Detailed Description Paragraph Right (3):

The dispensing apparatus 20 is positioned in the toilet tank at a level that coincides with water level indicator mark 33 provided on the front wall of the dispenser. The apparatus comprises three chambers, including a reservoir chamber 21 which contains solid disinfectant 22, a solid stabilizing salt 32 and a solid color signal composition 31. A baffle means 24 defines the top of this reservoir chamber.

Detailed Description Paragraph Right (10):

Alternative arrangements for locating the color signal and disinfecting ingredients in a dispenser are shown in FIGS. 3 and 4.

Detailed Description Paragraph Right (11):

In FIG. 3, solid disinfectant 61 is located in volume control chamber 60, and this chamber is in fluid communication with reservoir chamber 62 which contains a solid color signal composition 63 and a solid stabilizing salt 68 positioned immediately below baffle 64. The chamber 60 is also provided with air vent means 65, pinhole vent means 66 and a water level line 67. Except for the translocation of the disinfecting ingredient to the volume control chamber, this dispenser functions similar to that shown in FIG. 2 above.

Detailed Description Paragraph Right (12):

The construction of FIG. 4 comprises a reservoir chamber 70 which contains color

signal tablets 72, a solid stabilizing salt 71 and cleaning and disinfecting ingredient 73 located above baffle 74. The chamber 70 is in fluid communication with chamber 76 through conduit 78. The chamber 76 in turn communicates through conduit 80 with fluid inlet port 82.

Detailed Description Paragraph Right (14):

The concentrated solution passing into chamber 76 will also contain the color signal ingredient and the stabilizing salt; however, the color signal containing solution will be bleached by the cleaning and disinfecting agent so that no color will appear in the discharge from chamber 76 until the cleaning and disinfecting agent has been depleted.

Detailed Description Paragraph Right (15):

In each of FIGS. 2, 3 and 4 the stabilizing salt is depicted as a solid tablet, 32, 68 and 71, respectively, which is distinct from the solid cleaning and disinfecting ingredient and the solid color indicator composition (22 and 31, 61 and 63 and 73 and 72, respectively). However, the present invention contemplates that the stabilizing salt may be incorporated into either or both of the disinfecting and color indicator tablets, so that a separate, stabilizing salt tablet is not necessary. When the stabilizing salt is present as part of the disinfectant tablet and/or as a separate tablet, it is preferred that the tablet containing the stabilizing salt be in the same chamber as the solid color indicator composition so as to maximize the concentration of stabilizing salt in the solution to which the solid color indicator composition is exposed.

Detailed Description Paragraph Right (17):

The present invention specifically provides a cleaning and disinfecting composition and an improved method, such as the solid disinfectant ingredient 22 also containing a stabilizing salt, thereby obviating the need for tablet 32, and a solid color indicator composition 31 located in the chamber 21 of the dispenser 20, wherein the matrix of the solid composition is a matrix salt such that the cation of the stabilizing salt in the resulting solution displaces the cation of the matrix salt in the solid composition. This object may be achieved, e.g., where the cleaning and disinfecting ingredient results in an aqueous hypochlorite mixture containing calcium and the solid composition contains sodium stearate.

Detailed Description Paragraph Right (18):

The stabilizing salt may be any salt which is sufficiently soluble in water to expose the solid color indicator composition to an effective stabilizing concentration. This salt will, of course, be selected so that the cation of the stabilizing salt and the cation of the matrix salt are not the same. Stabilizing salts wherein the cation is an alkaline earth metal, such as Mg and Ca, and Fe, Mn, Co and Al are preferred. Calcium is particularly preferred.

Detailed Description Paragraph Right (19):

This stabilizing salt may be incorporated into the cleaning and disinfecting composition as a separate tablet. It is preferred, however, that the stabilizing salt be incorporated into at least one of the solid color indicator composition and the cleaning and disinfecting ingredient tablet. In the embodiment of the present invention which is most preferred, the stabilizing salt is selected such that it performs a dual function in the cleaning and disinfecting composition. Thus, the stabilizing salt may also be present as a solubilizing salt incorporated in the solid color indicator composition, as a filler salt in the cleaning and disinfecting ingredient tablet or as the cleaning and disinfecting agent, e.g. the active component of the cleaning and disinfecting ingredient.

Detailed Description Paragraph Right (20):

Although only theory, there may be several means by which the composition and method of the present invention help to preserve the physical integrity of the solid color indicator composition and retard the elution of dye therefrom. It may be that the complex formed by the stabilizing salt cation and the matrix salt anion, such as where the stabilizing salt is calcium hypochlorite and the matrix salt is sodium stearate, is less soluble in water than the matrix salt so that less of the matrix is dissolved from the tablet. For example, although sodium stearate is slightly water soluble, calcium stearate is essentially insoluble in water. Further, the complex may be more hydrophobic than the matrix salt. This may result in water being repelled from the solid color indicator tablet surface, thereby retarding elution of the dye.

Detailed Description Paragraph Right (21):

In the embodiment of the invention which is most preferred, the stabilizing salt and matrix salt are selected such that the valence of the cation of the stabilizing salt is greater than the valence of the matrix cation. This may permit the cation of the stabilizing salt to complex with more than one matrix anion, thereby decreasing the surface porosity of the solid color indicator composition and/or may permit the stabilizing salt cation to become complexed with at least one anion in addition to the matrix anion. This additional anion may serve to at least partially block the tablet pores and/or to repel other anions, such as hypochlorite, from the tablet surface.

Detailed Description Paragraph Right (23):

The solid color indicator composition comprises a dye ingredient for indicating color and a matrix agent which supports the color indicator. The solid composition is in the form of a solid tablet or cake with structural integrity, such as a tablet which has been compressed at a substantial pressure, e.g., from between about 5,000 lbs. and about 25,000 lbs. of die pressure. Preferably, however, the tablet should be manually or machine-pressed at pressures between 2.5 and 12.5 tons per square inch to densities between 1 and 2.25 grams per cubic centimeter. The solid color indicator tablets are so constructed that they generally retain their shape and size while continuously releasing the color indicator to the solution.

Detailed Description Paragraph Right (24):

The solid color indicator composition preferably comprises from between about 5 and about 40 percent by weight of the matrix agent. Although the matrix agent may be any salt having a cation which may undergo ion exchange with the cation of the stabilizing salt, the matrix agent preferably is a salt selected from the group consisting of alkali metal salts of long chain organic group. This organic anion preferably is an organic carboxylate containing at least 10 carbon atoms. Organic carboxylates containing at least 14 carbon atoms, such as a stearate, palmate, myristate, octadecenate or laurate anion are preferred. Alkali metal stearates, such as sodium stearate, lithium stearate and potassium stearate, and mixtures thereof, are particularly preferred; sodium stearate is most preferred.

Detailed Description Paragraph Right (26):

The color indicator composition also preferably comprises from between about 2 and about 20 percent by weight of a color indicator selected from the group consisting of a hypochlorite relatively stable arylmethane dye and mixtures thereof. In accordance with preferred embodiments of the invention, the color indicator comprises from between about 5 and about 15 percent by weight of a dye selected from the group consisting of FD & C Blue #1, FD & C Green #3, Intracid Pure Blue V, and mixtures thereof.

Detailed Description Paragraph Right (27):

The solid color indicator composition also preferably contains a solubilizing agent. This solubilizing agent preferably is a salt selected from the group consisting of alkali metal and alkaline earth metal salts and mixtures thereof. Inorganic salts, such as calcium chloride and sodium chloride are preferred. The solubilizing agent may make up between about 30 and 85 percent by weight of the solid color indicator composition, and most preferably comprises from between about 60 and 80 percent by weight sodium chloride with at least 50 percent by weight of the sodium chloride or the like having a mesh size between about 30 and about 100 prior to blending with the other ingredients. As indicated above, the stabilizing salt may also be a solubilizing agent, thereby minimizing or obviating the need to include a separate solubilizing agent. In this instance considerations relevant to selection of the stabilizing salt, discussed above, will also be relevant.

Detailed Description Paragraph Right (28):

In a preferred embodiment of the invention, the color indicator tablets or the like may also be coated with a protective coating comprising a shellac, a lacquer, or mixtures thereof. This coating will protect the compositions of the invention from air, humidity, etc., minimize dusting and make handling easier, and delay wetting of the composition when it is immersed in a container containing calcium hypochlorite.

Detailed Description Paragraph Right (29):

It is further preferred that a binder be added to the color indicator composition to assist in maintaining the physical integrity of the tablet. This binder may be any of a number of known, commercially available binders, such as microcrystalline cellulose.

Detailed Description Paragraph Right (30):

The color indicator tablets useful in the present invention also preferably have a critical porosity. With reference to this critical porosity, it has been observed that there is a correlation between the porosity of a tablet or the like and the rate of controlled release in a bleach solution of the color indicator and the duration of physical integrity of the tablet. Porosity for the purposes of the present invention is defined as the volume percentage of a petroleum distillate such as kerosene which is absorbed by the tablet under test conditions. This porosity may be further described as the controlled release structure developed in the tablet, this structure comprising a labyrinth of channels and passageways that are created when the blend of matrix agent and color indicator, and preferably solubilizing agent, are compressed under various conditions such as described in Table I below.

Detailed Description Paragraph Right (32):

In accordance with the preferred embodiment of the invention, the porosity of the tablets preferably should be 10% or less by volume and more preferably between about 4% and 8% by volume. It has been found that when the porosity of tablets is excessive, then the controlled rate of release of the color indicator may possibly not be obtained and the tablet can be exhausted of color indicator or may disintegrate before the bleach concentration of the aqueous bleach medium being monitored falls below an effective level. In such cases, a tablet may become exhausted of color in less than 30 days which will ordinarily be prior to the exhaustion of the toilet bowl cleaner being monitored.

Detailed Description Paragraph Right (36):

Those disinfecting agents which yield a hypochlorite species in aqueous solution include hypochlorites, hypochlorite addition products, chloramines, chloramines, chloramides, and chlorimides. Specific examples of compounds of this type consistent with the present invention include lithium hypochlorite, calcium hypochlorite, calcium hypochlorite dihydrate, monobasic calcium hypochlorite, dibasic magnesium hypochlorite, chlorinated trisodium phosphate dodecahydrate, potassium dichloroisocyanurate, trichlorocyanuric acid, sodium dichloroisocyanurate, sodium dichloroisocyanurate dihydrate, 1,3-dichloro-5,5-dimethylhydantoin, N-chlorosulfamide, Chloramine T, Dichloramine T., Chloramine B and Dichloramine B.

Detailed Description Paragraph Right (43):

According to the method of the present invention, it is preferred that the solution to which this solid color indicator composition is initially exposed contains a concentration of stabilizer salt cation sufficient to encourage early formation of a surface barrier in the solid color indicator composition. In the preferred embodiment, the initial concentration of the stabilizing salt cation in the solution should be such that sufficient stabilizing cations are present to complex substantially all of the matrix anions present at the color indicator tablet surface. In the embodiment which is most preferred, wherein the solid color indicator composition comprises about 10 to 30% by weight sodium stearate and the stabilizing salt contains calcium it is preferred that the solution initially contain at least 2% by weight calcium. More preferably, the initial calcium concentration is at least 3% by weight. Initial calcium concentrations of 6% by weight or more are most preferred.

Detailed Description Paragraph Right (44):

Solid color indicator tablets for use in the present invention were made by the following procedure: FD & C Green #3 dye (8 lbs.) and sodium stearate (16 lbs.), having a particle size such that 93% would pass thru 100 mesh, were placed in a vaned rotary drum mixer and mixed for 5 minutes. Sodium chloride (54.4 lbs.) was added, and mixing continued. After 2 minutes microcrystalline cellulose (1.6 lbs.) was added and mixing continued for 6 minutes. This resulted in a homogeneous powder which was pressed into 3 gram, 9/16".times.9/16" tablets on a rotary tablet press at a pressure of approximately 17,000 lbs. The tablets were dusted with sodium stearate and coated 3 to 4 times with shellac.

Detailed Description Paragraph Right (50):

In the following descriptions, floatation of the dye tablets is referred to. Dye tablets float when enough of the sodium chloride solubilizing salt dissolves away to make the tablets less dense than the solution they are in contact with. Virtually all tablets will float given enough time but on the shorter term, the length of time required for a tablet to become buoyant gives an indication of the extent of the surface barrier established through ion exchange between the stabilizing salt and the matrix salt. Creation of a surface barrier will slow dissolution of the tablets'

sodium chloride content, therefore lengthening the time to buoyancy.

Detailed Description Paragraph Right (51):

Also referred to in Table II, is overnight solution color. This is the color developed on dropping the dye tablet into the test solution, after the tablet has stood in the solution overnight. Tablet interior color is the color observed on cutting the tablet in half after the solution exposure time. Intensity of the observed colors is indicated by the abbreviations v. lt., very light; lt., light; med., medium; and dk., dark. In the tables below "NA" means "not available".

Detailed Description Paragraph Right (52):

The ion exchange between the ingredient salt in the solution and the matrix salt in the solid color indicator composition was demonstrated by a set of experiments wherein several tablets, of the tablet formulation indicated above for Examples 2-6, were placed in aqueous solutions of 0%, 1%, 3% and 6% calcium hypochlorite. At the time intervals indicated, a tablet was removed from each of these solutions. These tablets were washed, dried, and the outer 1 millimeter of the surface analyzed for calcium. At the end of 6 days (approximately 146 hours), the remaining tablets were dropped in fresh, distilled water. The results of these experiments are shown below in Table III.

Detailed Description Paragraph Type 1 (3):

10% FD&C Green #3 dye

CLAIMS:

1. An article of manufacture comprising a dispenser adapted for suspension in a tank containing a solution including water, the dispenser defining means for storing:

(a) a cleaning and disinfecting ingredient which includes a cleaning and disinfecting agent;

(b) a solid color indicator composition which includes a color indicator agent and a matrix agent supporting said color indicator agent, said matrix agent comprising a matrix salt having a cation; and,

(c) stabilizing salt having a cation; and,

said dispenser including chamber means for receiving amounts of solution, and means defined by the dispenser permitting entry and egress of solution relative to said chamber means whereby solution from said tank can enter said chamber means and solution from said chamber means can be dispensed into said tank, said dispenser also providing means for maintaining communication between the said chamber means and said means for storing said ingredient, said composition and said stabilizing salt such that the presence of a solution in the dispenser will form an aqueous solution within the dispenser which includes said stabilizing salt and said cleaning and disinfecting ingredient, the presence of said stabilizing salt in said aqueous solution resulting in the cation of the stabilizing salt displacing the cation of the matrix salt in the solid color indicator composition, said cleaning and disinfecting ingredient comprising a material that has a bleaching tendency relative to said color indicator agent whereby the display of color in the solution is at least minimized for as long as significant amounts of the cleaning and disinfecting ingredient are present, the relative amounts of said cleaning and disinfecting ingredient and of said color indicator agent stored in said dispenser being such that said cleaning and disinfecting ingredient is depleted first whereby the continued release of the color indicator agent from said solid color indicator composition after depletion of the ingredient results in as substantial display of color whereby the depletion of the cleaning and disinfecting ingredient can be detected.

8. The article of manufacture of claim 6 wherein said solid color indicator composition includes a solubilizing agent which is a salt.

12. An improved method for detecting the depletion of a cleaning and disinfecting ingredient in a tank containing a solution including water and initially containing the ingredient, said method comprising placing a dispenser in an aqueous medium, said dispenser defining means for storing a cleaning and disinfecting combination which includes:

(a) a cleaning and disinfecting ingredient which includes a cleaning and disinfecting

agent;

(b) a solid color indicator composition which includes a color indicator agent and a matrix agent supporting said color indicator agent, said matrix agent comprising a matrix salt having a cation; and,

(c) a stabizing salt having a cation;

said dispenser including chamber means for receiving amounts of the solution, and means defined by the dispenser permitting entry and egress of solution relative to said chamber means whereby solution from said tank can enter said dispenser and solution from said chamber means can be dispensed into said tank, bridging said ingredient, said composition and said salt together with said solution within said chamber means and maintaining communication between said chamber means and said means for storing said ingredient, said composition and said stabilizing salt for thereby forming within the dispenser an aqueous solution, said aqueous solution including said stabilizing salt and said cleaning and disinfecting ingredient, the presence of said stabilizing salt in said aqueous solution resulting in the cation of the stabilizing salt displacing the cation of the matrix salt in the solid color indicator composition, said cleaning and disinfecting ingredient comprising a material that has a bleaching tendency relative to said color indicator agent such that the display of color in the solution is at least minimized for as long as significant amounts of the cleaning and disinfecting ingredient are present, the relative amounts of said cleaning and disinfecting ingredient and of said color indicator agent stored in said dispenser being such that said cleaning and disinfecting ingredient is depleted first whereby the continued release of the color indicator agent from said solid color indicator composition after depletion of the ingredient results in a substantial display of color whereby the depletion of the cleaning and disinfecting ingredient can be detected.

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☐ 1. Document ID: US 6352837 B1

L11: Entry 1 of 7

File: USPT

Mar 5, 2002

US-PAT-NO: 6352837

DOCUMENT-IDENTIFIER: US 6352837 B1

TITLE: Rapid readout sterilization indicator for liquid peracetic acid sterilization procedures

DATE-ISSUED: March 5, 2002

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Witcher; Kelvin J.	St. Paul	MN		
Woodson; Lewis P.	Apple Valley	MN		

US-CL-CURRENT: [435/31](#); [435/176](#), [435/177](#), [435/180](#), [435/182](#), [435/287.4](#), [435/288.1](#), [435/288.7](#), [435/32](#), [435/810](#)

[Full](#) | [Title](#) | [Citation](#) | [Front](#) | [Review](#) | [Classification](#) | [Date](#) | [Reference](#) | [Sequences](#) | [Attachments](#)

[KWC](#) | [Draw Desc](#) | [Image](#)

☐ 2. Document ID: US 4668475 A

L11: Entry 2 of 7

File: USPT

May 26, 1987

US-PAT-NO: 4668475

DOCUMENT-IDENTIFIER: US 4668475 A

TITLE: Cleaning and disinfecting method and article of manufacture including color display

DATE-ISSUED: May 26, 1987

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Meloy; Gilbert K.	Cincinnati	OH		

US-CL-CURRENT: [422/37](#); [116/203](#), [4/227.1](#), [4/227.6](#), [422/119](#), [422/264](#), [422/266](#), [424/665](#), [436/164](#), [436/2](#), [510/192](#), [510/373](#), [510/380](#), [510/382](#), [510/441](#), [510/446](#), [510/447](#), [510/508](#)

[Full](#) | [Title](#) | [Citation](#) | [Front](#) | [Review](#) | [Classification](#) | [Date](#) | [Reference](#) | [Sequences](#) | [Attachments](#)

[KWC](#) | [Draw Desc](#) | [Image](#)

☐ 3. Document ID: US 4539179 A

L11: Entry 3 of 7

File: USPT

Sep 3, 1985

US-PAT-NO: 4539179

DOCUMENT-IDENTIFIER: US 4539179 A

TITLE: Method for cleansing and disinfecting toilet tanks and bowls

DATE-ISSUED: September 3, 1985

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Meloy; Gilbert K.	Earlville	IL		

US-CL-CURRENT: 422/28; 422/266, 422/37

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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KWIC	Draw Desc	Image
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☐ 4. Document ID: US 4435857 A

L11: Entry 4 of 7

File: USPT

Mar 13, 1984

US-PAT-NO: 4435857

DOCUMENT-IDENTIFIER: US 4435857 A

TITLE: Apparatus for cleansing and disinfecting toilet tanks and bowls

DATE-ISSUED: March 13, 1984

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Meloy; Gilbert K.	Earlville	IL		

US-CL-CURRENT: 4/227.6; 4/222

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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☐ 5. Document ID: US 4420412 A

L11: Entry 5 of 7

File: USPT

Dec 13, 1983

US-PAT-NO: 4420412

DOCUMENT-IDENTIFIER: US 4420412 A

TITLE: Activation of hypochlorite bleaching of dyes

DATE-ISSUED: December 13, 1983

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Wong; Louis F.	Fairfield	OH		

US-CL-CURRENT: 252/186.38; 252/186.25, 252/186.36, 252/187.24, 510/108, 510/192, 510/193, 510/379, 510/435, 510/438, 510/440, 510/447

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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☐ 6. Document ID: US 4384869 A

L11: Entry 6 of 7

File: USPT

May 24, 1983

US-PAT-NO: 4384869

DOCUMENT-IDENTIFIER: US 4384869 A

TITLE: Activation of hypochlorite bleaching of dyes

DATE-ISSUED: May 24, 1983

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Wong; Louis F.	Fairfield	OH		

US-CL-CURRENT: 8/527; 8/462, 8/620, 8/657, 8/658

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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☐ 7. Document ID: US 4353866 A

L11: Entry 7 of 7

File: USPT

Oct 12, 1982

US-PAT-NO: 4353866

DOCUMENT-IDENTIFIER: US 4353866 A

TITLE: Activation of hypochlorite bleaching of dyes

DATE-ISSUED: October 12, 1982

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP CODE	COUNTRY
Wong; Louis F.	Fairfield	OH		

US-CL-CURRENT: 422/37; 4/227.1, 4/DIG.9, 422/266

Full	Title	Citation	Front	Review	Classification	Date	Reference	Sequences	Attachments
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